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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,774	08/27/2001	Young-Hun Bae	29925/37672	6787

4743 7590 02/28/2003

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EXAMINER
BREWSTER, WILLIAM M

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 02/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/940,774	Applicant(s) BAE ET AL.	
	Examiner William M. Brewster	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *1,2,6 and 7* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-5 and 8-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *10*.
4)☐ Interview Summary (PTO-413) Paper No(s). _____
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other:

DETAILED ACTION

Election/Restrictions

Claims 1-2, 6-7 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 10.

Applicant's election of claims 3-5, 8-10 in Paper No. 10 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Specification

The disclosure is objected to because of the following informalities: page 5, line 19, "000 Å" is not an acceptable dimension format.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3-5, 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art in view of Shin et al., U.S. Patent No. 6,187,686 in further view of Wolf, Vol. I, pp. 539-42, 581-82.

The APA teaches a method for forming a gate electrode of high integration semiconductor device comprising the steps of: in fig. 1A, sequentially depositing a gate oxide layer 1A, a polysilicon layer 2, a tungsten nitride layer 3, a tungsten layer 4, and a nitride layer 5, on the semiconductor substrate 1, depositing an antireflection layer 6 sequentially on the resultant material; in fig. 1B and 1C, forming a pattern by depositing a photoresist layer on the anti-reflection layer and executing a mask process.

The APA does not teach forming an etching prevention layer on the gate electrode stack, but Shin does. Shin teaches, in fig. 2, sequentially depositing a gate oxide layer 4, a polysilicon layer 6, on the semiconductor substrate 2, forming a resultant material on the semiconductor substrate by depositing an etching prevention layer 12, wherein the etching prevention layer has a thickness ranging from about 50 to about 1000A: approximately 300 Å, col. 3, line 57 - col. 4, line 14; in figs. 3 and 4, forming a pattern by depositing a photoresist layer (not shown) on the gate stack executing a mask process; and etching the etching prevention layer and the polysilicon layer with an etching gas comprising chlorine, col. 4, lines 15-52. Shin gives motivation in col. 2, lines 19-24. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Shin's process with the APA's invention would have been beneficial because it provides for an improved gate electrode stack with reduced sidewall erosion.

The APA and Shin teaches the etching of the nitride, tungsten, and the tungsten nitride layers, but does not specify the carrier gases, but Wolf does. Wolf teaches on page 581, Table 5, the etching of Si_3N_4 with a fluorine gas, CF_4, the etching of W with fluorine gases CF_4, and SF_6, and although Wolf does not specifically mention WN, as a fluorine gas is used to etch every other material in the table, a fluorine gas may be used for etching of WN. Wolf gives motivation on p. 539, 3rd ¶. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Wolf's process with APA's and Shin's invention would have been beneficial because it eliminates the handling, consumption, and disposal of the large quantities of dangerous acids and solvents.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William M. Brewster whose telephone number is 703-305-5906. The examiner can normally be reached on Full Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3432 for regular communications and 703-305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

WB
February 14, 2003